NHTSA Pedestrian Safety Program: "Heed the Speed" and Other Research

Marvin Levy

National Highway Traffic Safety Administration

Pro Walk/Pro Bike Conference

Victoria, British Columbia

September 2004

Persons Killed in Motor Vehicle Crashes, by Role

Role	Year		Change	% Change
	2002	2003		
Occupants	34,105	33,471	-634	-1.9%
Drivers	23,625	23,258	-367	-1.6%
Passengers	10,370	10,108	-262	-2.5%
Motorcycle Riders	3,270	3,661	+391	12%
Non-Occupants	5,630	5,511	-119	-2.1%
Pedestrians	4,851	4,749	-102	-2.1%
Pedalcyclists	665	622	-43	-6.5%
Other*	114	140	+26	23%
TOTAL	43,005	42,643	-362	-0.8%

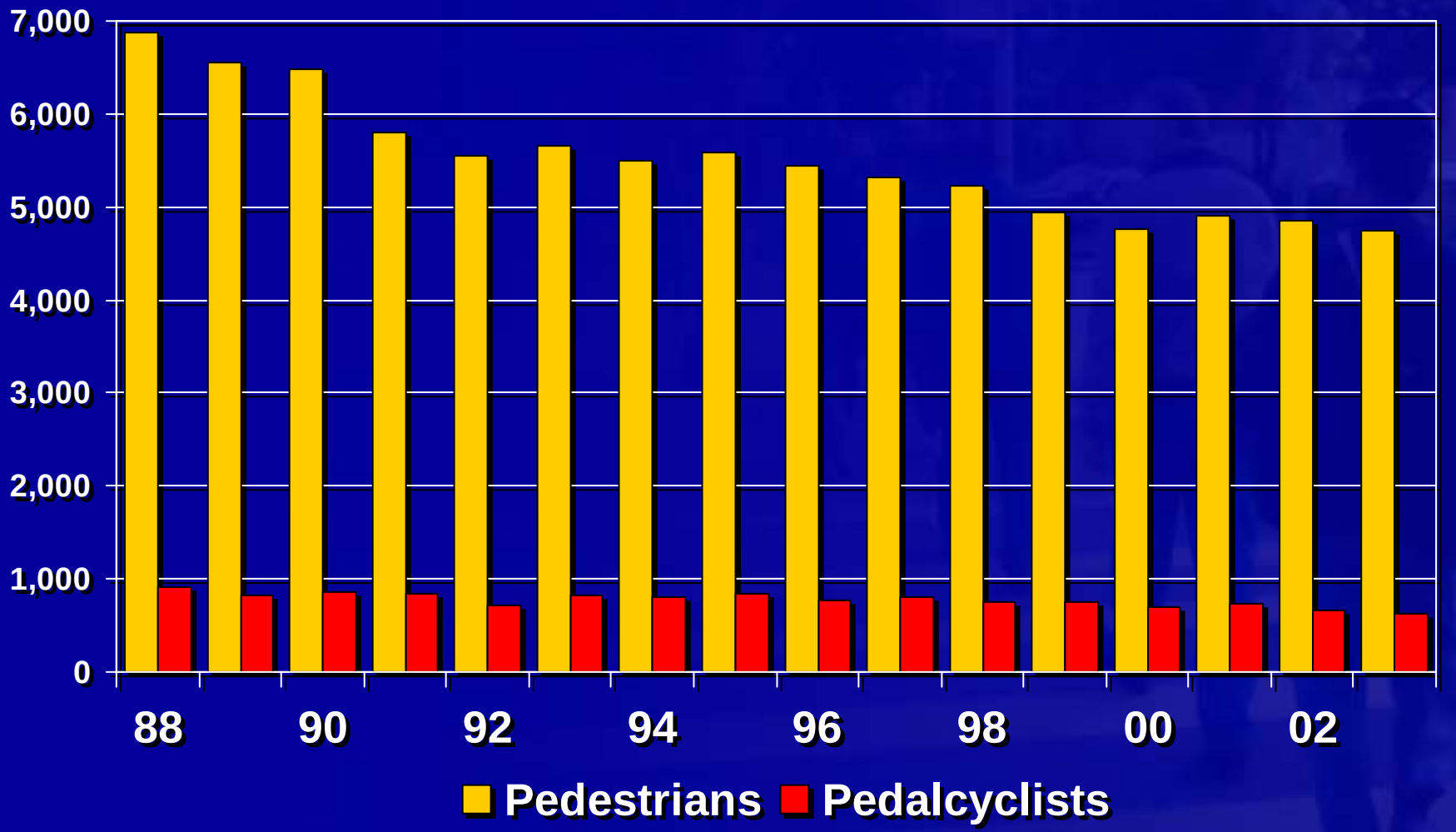
*Includes occupants of motor vehicles not in transport and of non-motor vehicle transport devices.
Source: FARS

Persons Injured in Motor Vehicle Crashes, by Role

Role	Year		% Change
	2002	2003	
Occupants	2,735,000	2,697,000	-1.4%
Drivers	1,863,000	1,840,000	-1.2%
Passengers	873,000	857,000	-1.8%
Motorcycle Riders	65,000	67,000	+3.1%
Non-Occupants	126,000	124,000	-1.6%
Pedestrians	71,000	70,000	-1.4%
Pedalcyclists	48,000	46,000	-4.2%
Other*	7,000	8,000	+14%
TOTAL	2,926,000	2,889,000	-1.3%

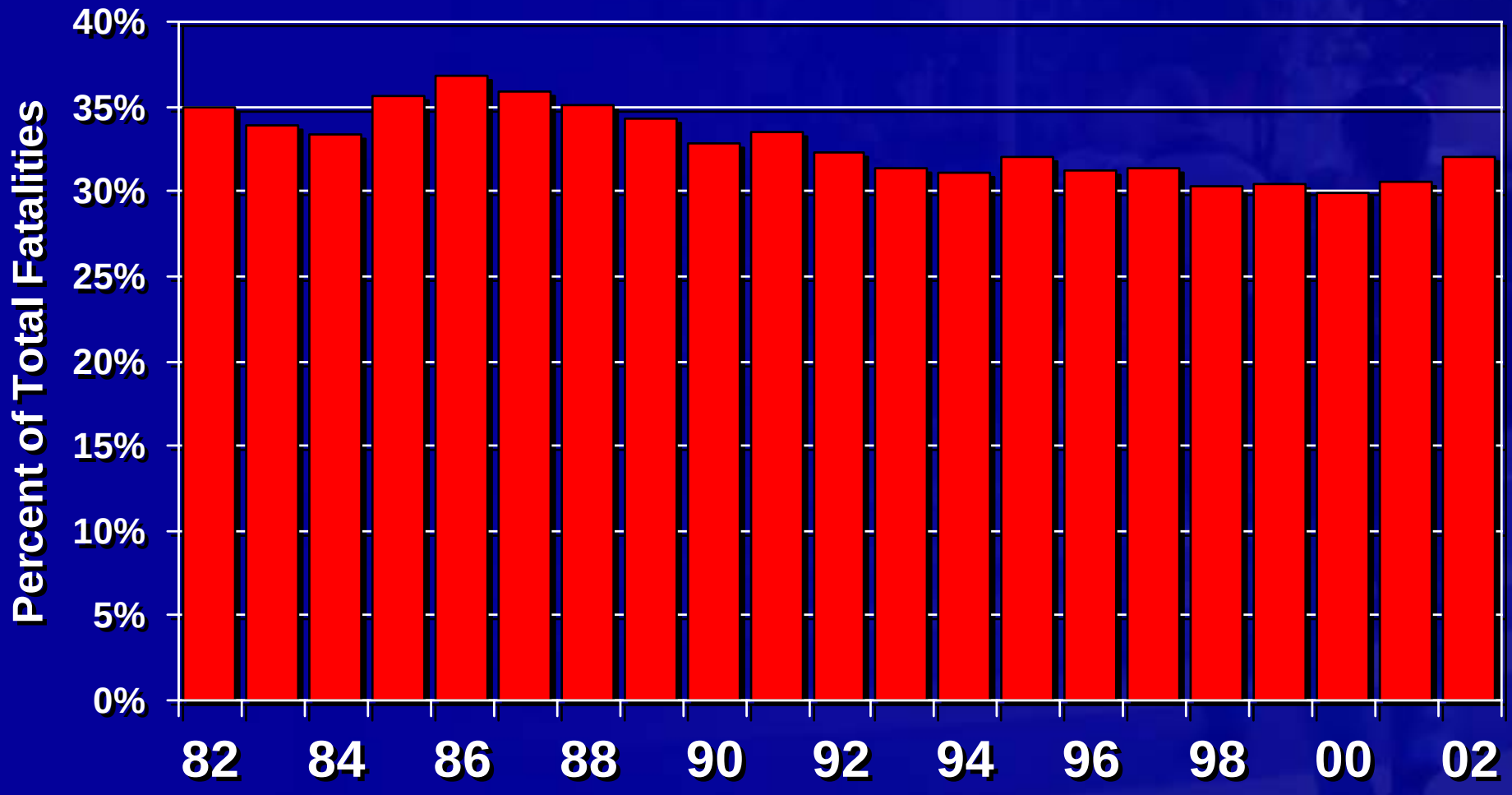
Note: Totals may not add due to rounding. Percentages computed after rounding. Source: NASS GES
Changes are not statistically significant.
*Includes occupants of motor vehicles not in transport and of non-motor vehicle transport devices.

Pedestrians and Pedalcyclists Killed



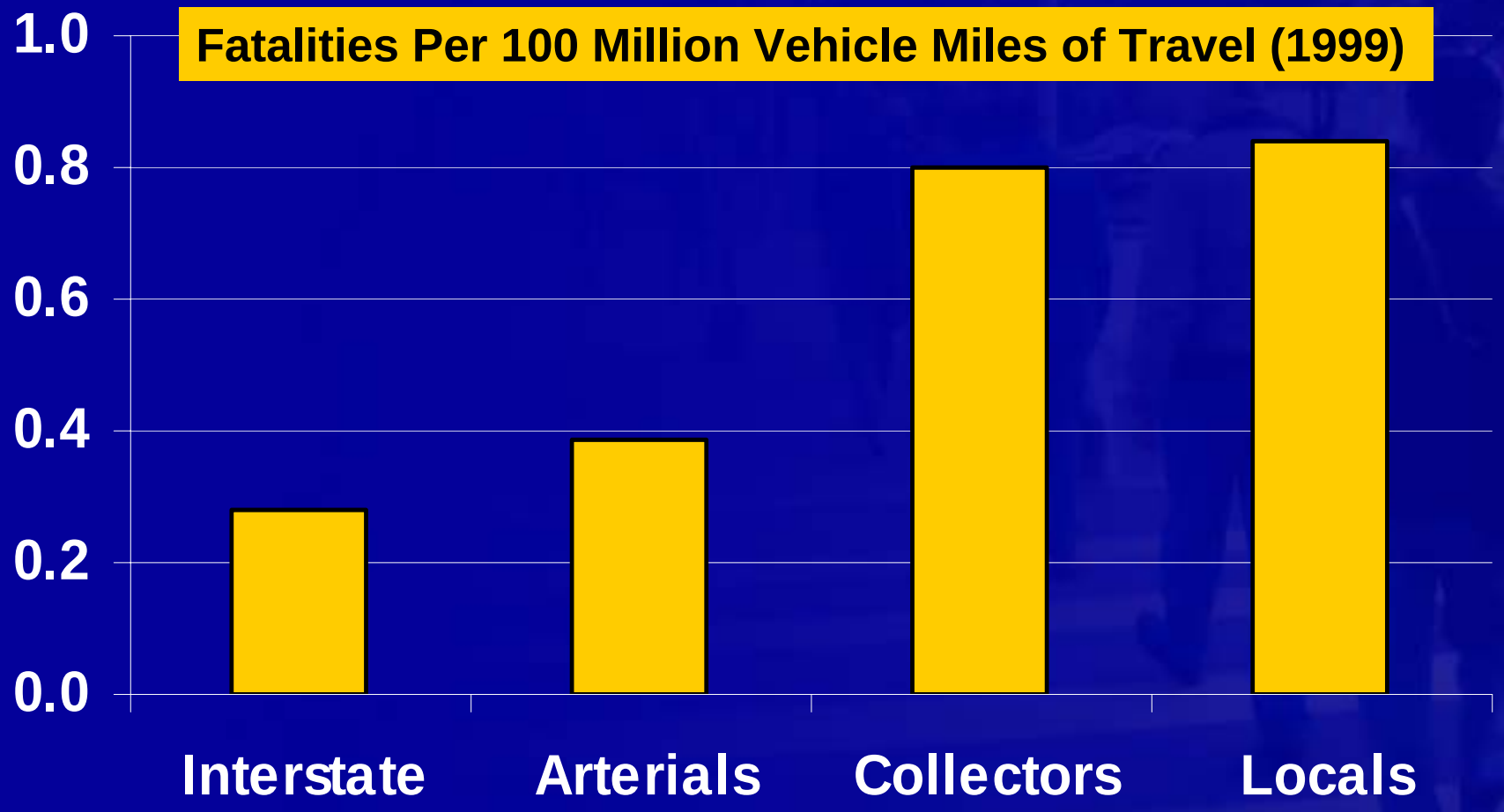
Source: FARS

Speeding-Related Fatalities As Percent of Total Fatalities 1982-2002



Source: FARS Final 1982 – 2001, ARF 2002

Speeding Fatality Rate Nearly 3 Times Higher on Local and Collector Roads



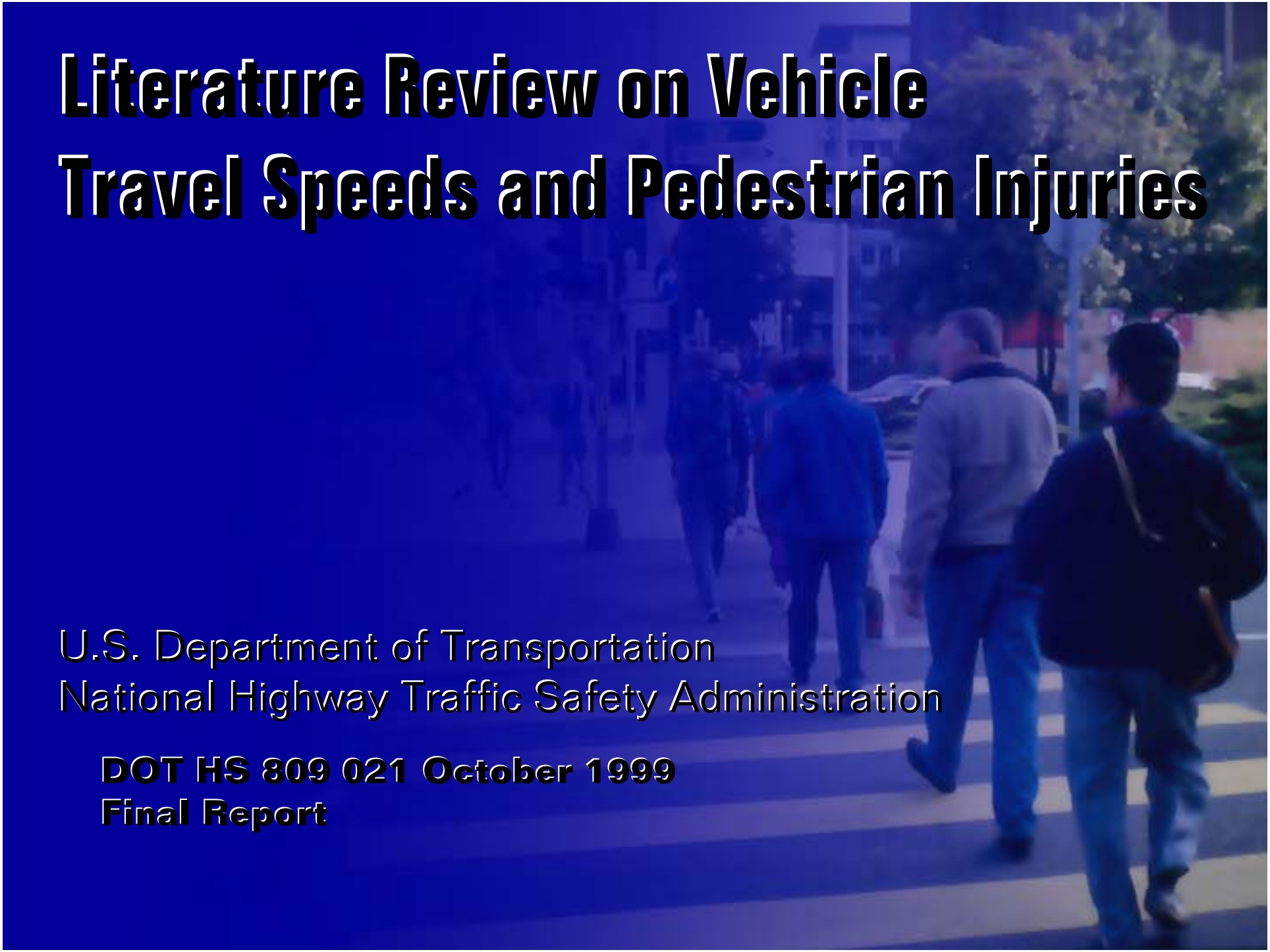
Remarks Prepared for Jeffrey W. Runge, MD Administrator at Lifesavers 22 on March 29, 2004

- Priorities 2004 and Beyond
  - Increase safety belt use
  - Reduce impaired driving
  - Improve our data collection and analysis
  - Reduce rollovers
  - Improve vehicle compatibility

Continued Remarks

- Speeding is a problem that cannot be ignored
  - Speeding continues to be cited as a major factor in almost one **third** (32%) of traffic fatalities nationally and is estimated to cost $40 billion each year.
  - The data also tell us that the most significant problems are on local roadways and collector roads.
  - The Department of Transportation has a speeding management team with members from FHWA, FMCSA and NHTSA
  - The speeding team from these 3 agencies is currently co-sponsoring demonstration projects around the country focused on setting, enforcing and adjudicating *rational* speed limits.
- Ultimately, it will take a combination of traditional enforcement, improved data collection, public education, technology and engineering to fully address the problem.

Literature Review on Vehicle Travel Speeds and Pedestrian Injuries



U.S. Department of Transportation
National Highway Traffic Safety Administration

DOT HS 809 021 October 1999
Final Report

Pedestrian Injury Severity As a Function of Speed Limit 1994-1996

Pedestrian Injury Severity	Posted Speed Limit						Total
	<=20 mph	25 mph	30 mph	35 mph	40-50 mph	50+ mph	
Fatal injury	1.2%	1.8%	5.4%	4.1%	8.6%	22.2%	5.7%
Incapacitating	14.6%	18.2%	23.4%	23.4%	30.8%	26.0%	22.8%
Nonincapacitating	39.9%	34.5%	32.4%	33.7%	26.5%	19.9%	31.7%
Minor or none	44.3%	45.5%	38.7%	38.8%	34.1%	31.9%	39.7%
Total Frequency	11,564	84,948	45,672	70,810	42,521	24,013	279,528

Source: FARS (fatals) and GES; all pedestrians with known injury severity

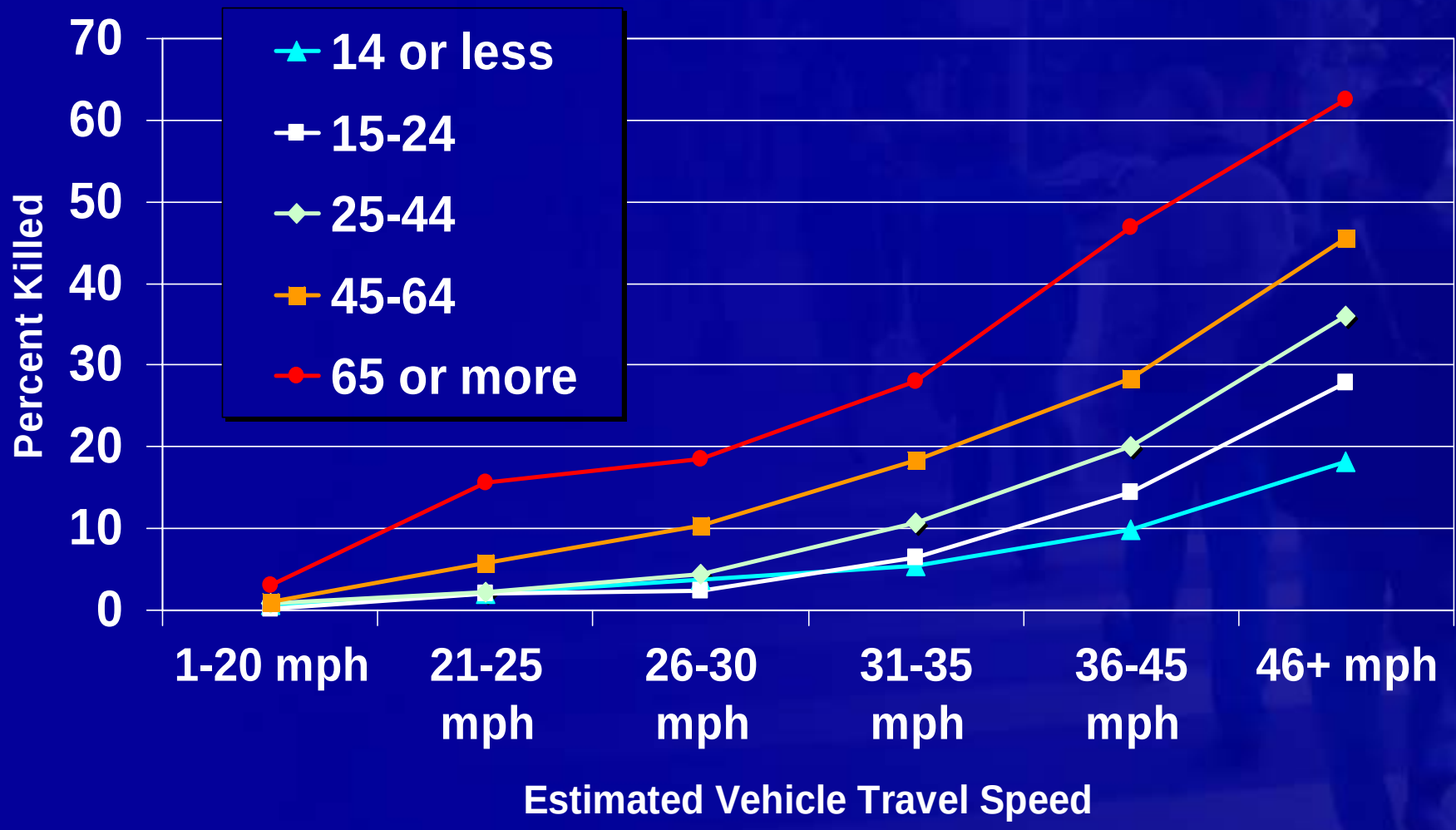
Vehicle Travel Speed and Pedestrian Injury Severity

(Florida, 1993-1996; pedestrians in single-vehicle crashes)

Injury Severity	Travel Speed (Officer Estimates)						Total
	1-20 mph	21-25 mph	26-30 mph	31-35 mph	36-45 mph	46+ mph	
Fatal injury	1.1%	3.7%	6.1%	12.5%	22.4%	36.1%	6.5%
Incapacitating	19.4%	32.0%	35.9%	39.3%	40.2%	33.7%	27.0%
Nonincapacitating	43.8%	41.2%	36.8%	31.6%	24.7%	20.5%	38.8%
Possible inj or none	35.6%	23.0%	21.2%	16.6%	12.7%	9.7%	27.7%
Total Frequency	13,368	1,925	2,873	2,188	2,493	906	23,753

Fatal Injury Rates by Vehicle Speed, by Pedestrian Ages

(Florida, 1993-1996; pedestrians in single-vehicle crashes)



Distribution of Pedestrian Crash "Covariates" by Speed Limits (GES, 1994-1996)

		Speed Limits						Row Total n= 238,413
		<=20 mph n=11,484	25 mph n= 89,794	30 mph n= 45,202	35 mph n= 72,265	40-45 mph n=42,522	50+ mph n=22,146	
Sex	Male	4.3%	29.9%	15.4%	25.5%	16.2%	8.7%	58.3%
	Female	3.7%	34.2%	16.7%	25.5%	13.3%	6.6%	41.7%
Age	0-14	5.6%	40.5%	16.8%	22.2%	10.7%	4.1%	30.5%
	15-24	4.5%	31.8%	14.7%	22.6%	17.7%	8.6%	18.0%
	25-44	3.0%	23.7%	17.4%	29.7%	16.3%	10.0%	26.8%
	45-64	3.2%	27.9%	15.5%	26.5%	17.8%	9.1%	12.2%
	65 or older	2.3%	36.3%	14.0%	29.1%	19.8%	8.6%	8.0%
	unknown	2.9%	38.9%	11.0%	25.0%	10.0%	12.1%	4.4%

Distribution of Pedestrian Crash "Covariates" by Speed Limits (GES, 1994-1996)

		Speed Limits						Row Total n= 238,413
		<=20 mph n=11,484	25 mph n= 89,794	30 mph n= 45,202	35 mph n= 72,265	40-45 mph n=42,522	50+ mph n=22,146	
Day	Weekday	4.4%	31.2%	16.0%	25.9%	14.9%	7.6%	74.8%
	Sat-Sun	3.1%	33.2%	15.7%	24.3%	15.3%	8.4%	25.2%
Time	Midnight-5:59 am	2.8%	24.0%	17.9%	24.0%	13.3%	18.1%	6.4%
	6:00-9:59 am	2.3%	35.1%	15.6%	24.2%	14.2%	8.6%	13.8%
	10 am-3:59 pm	6.4%	32.2%	14.1%	27.4%	13.4%	6.5%	30.9%
	4 – 7:59 pm	3.3%	34.2%	16.8%	25.6%	14.2%	5.9%	32.2%
	8 – 11:59 pm	3.1%	26.0%	17.3%	23.4%	20.8%	9.5%	16.7%

Distribution of Pedestrian Crash "Covariates" by Speed Limits (GES, 1994-1996) Intersection Y/N and Traffic Control, Weather

	Speed Limits						Row Total n= 238,413
	<=20 mph n=11,484	25 mph n= 89,794	30 mph n= 45,202	35 mph n= 72,265	40-45 mph n=42,522	50+ mph n=22,146	
Intsctn-no control	5.6%	33.2%	13.6%	28.8%	13.9%	5.1%	15.5%
RYG signal	1.1%	24.7%	20.7%	37.9%	14.6%	0.9%	18.8%
Stop/yield/etc.	5.2%	47.9%	11.7%	22.8%	8.5%	3.9%	6.8%
Non-intersection	4.4%	31.6%	15.3%	20.7%	16.6%	11.4%	56.8%
Other/unknown	7.0%	32.1%	21.8%	29.6%	3.5%	6.0%	2.1%
No adverse	4.1%	32.0%	16.0%	25.8%	15.0%	7.1%	87.7%
rain	2.2%	30.2%	15.2%	24.3%	15.5%	12.6%	9.6%
All other (include)	7.7%	26.0%	18.3%	20.0%	13.7%	14.4%	2.7%

Distribution of Pedestrian Crash "Covariates" by Speed Limits (GES, 1994-1996)

		Speed Limits						Row Total n= 238,413
		<=20 mph n=11,484	25 mph n= 89,794	30 mph n= 45,202	35 mph n= 72,265	40-45 mph n=42,522	50+ mph n=22,146	
AREA	Urban	2.9%	33.1%	18.1%	31.3%	10.6%	4.0%	54.7%
	10% rural	4.4%	33.0%	17.6%	17.1%	22.2%	5.8%	14.8%
	20-30% rural	4.8%	35.7%	10.5%	17.7%	20.8%	10.4%	17.8%
	40% or more rural	7.5%	18.4%	12.3%	21.2%	17.6%	23.0%	12.6%
LIGHT	Daylight	4.9%	36.2%	15.1%	25.7%	12.5%	5.6%	63.3%
	Dark	1.2%	16.7%	8.3%	15.2%	31.1%	27.5%	9.4%
	Dark, lighted	3.1%	25.1%	20.3%	29.5%	16.0%	6.0%	22.9%
	Dawn or dusk	3.5%	33.7%	21.6%	23.7%	11.3%	6.3%	4.4%

Distribution of Pedestrian Crash "Covariates" by Posted Speed Limit (FARS, 1989-1997; crashes with known speed limits)

		Speed Limits						Row Total n= 50,147
		<=20 mph n=424	25 mph n= 4,786	30 mph n= 8,069	35 mph n= 9,079	40-45 mph n=10,765	50+ mph n=17,024	
Sex	Male	0.7%	8.2%	14.4%	17.1%	21.5%	38.0%	69.4%
	Female	1.1%	12.5%	19.9%	20.4%	21.3%	24.8%	30.6%
Age	0-14	2.2%	19.1%	19.9%	17.4%	18.1%	23.2%	13.0%
	15-24	0.7%	4.6%	9.9%	12.5%	20.5%	51.7%	12.0%
	25-44	0.4%	5.2%	11.3%	15.4%	22.5%	45.3%	31.8%
	45-64	0.6%	8.6%	16.2%	21.0%	23.6%	30.0%	19.7%
	65 or older	1.0%	14.0%	24.0%	23.1%	20.7%	17.3%	22.4%
	unknown	0.2%	3.7%	12.8%	13.6%	19.8%	50.0%	1.1%

Distribution of Pedestrian Crash "Covariates" by Posted Speed Limit (FARS, 1989-1997; crashes with known speed limits)

		Speed Limits						Row Total n= 50,147
		<=20 mph n=424	25 mph n= 4,786	30 mph n= 8,069	35 mph n= 9,079	40-45 mph n=10,765	50+ mph n=17,024	
Day	Weekday	1.0%	10.2%	17.2%	18.5%	21.6%	31.4%	68.1%
	Sat-Sun	0.6%	8.1%	13.7%	17.2%	21.2%	39.3%	31.9%
Time	Midnight-5:59 am	0.5%	4.7%	9.9%	13.7%	20.1%	51.1%	18.4%
	6:00-9:59 am	1.7%	13.2%	19.9%	19.3%	18.8%	27.0%	9.7%
	10 am-3:59 pm	1.7%	15.3%	23.5%	18.0%	16.5%	24.9%	16.4%
	4 – 7:59 pm	0.8%	12.0%	17.8%	20.5%	22.4%	26.5%	26.5%
	8 – 11:59 pm	0.3%	5.9%	13.0%	18.4%	25.3%	37.0%	29.1%

Distribution of Pedestrian Crash "Covariates" by Posted Speed Limit (FARS, 1989-1997; crashes with known speed limits)

Intersection Y/N and Traffic Control, Weather

	Speed Limits						Row Total n= 50,147
	<=20 mph n=424	25 mph n= 4,786	30 mph n= 8,069	35 mph n= 9,079	40-45 mph n=10,765	50+ mph n=17,024	
Intsctn-no control	0.7%	14.2%	21.0%	25.8%	22.7%	15.6%	4.8%
RYG signal	0.9%	14.4%	29.1%	24.6%	22.7%	8.3%	3.7%
Stop/yield/etc.	1.9%	24.0%	24.0%	23.0%	16.3%	10.9%	1.0%
Non-intersection	0.7%	8.2%	13.2%	16.4%	22.2%	39.2%	75.2%
Other/unknown	1.5%	12.5%	25.2%	22.2%	17.3%	21.4%	15.2%
No adverse	0.9%	9.6%	15.5%	18.2%	21.8%	34.1%	87.9%
rain	0.6%	10.4%	22.3%	19.2%	20.9%	26.7%	9.1%
All other (include)	1.2%	5.5%	15.3%	12.6%	14.3%	51.1%	3.0%

Distribution of Pedestrian Crash "Covariates" by Posted Speed Limit (FARS, 1989-1997; crashes with known speed limits)

		Speed Limits						Row Total n= 50,147
		<=20 mph n=424	25 mph n= 4,786	30 mph n= 8,069	35 mph n= 9,079	40-45 mph n=10,765	50+ mph n=17,024	
Area	Urban	0.9%	11.8%	20.9%	22.3%	22.9%	21.2%	70.5%
	Rural	0.8%	4.1%	4.6%	8.0%	17.9%	64.6%	29.5%
Light	Daylight	1.8%	15.8%	22.1%	18.8%	16.7%	24.8%	32.7%
	Dark	0.3%	2.6%	5.4%	9.4%	22.7%	59.6%	31.9%
	Dark, lighted	0.4%	9.9%	20.1%	26.2%	25.3%	18.0%	31.6%
	Dawn or dusk	0.8%	11.4%	20.5%	17.6%	20.0%	29.6%	3.9%

Distribution of Pedestrian Crash "Covariates" by Posted Speed Limit (FARS, 1989-1997; crashes with known speed limits)

		Speed Limits						Row Total n= 50,147
		<=20 mph n=424	25 mph n= 4,786	30 mph n= 8,069	35 mph n= 9,079	40-45 mph n=10,765	50+ mph n=17,024	
Driver Sex	Male	0.8%	9.4%	16.4%	17.6%	21.2%	34.6%	75.1%
	Female	1.0%	9.9%	13.8%	19.4%	24.5%	31.4%	24.9%
Driver Age	16-17	1.3%	10.5%	12.9%	18.8%	26.5%	29.9%	3.6%
	18-20	0.7%	9.7%	15.8%	17.7%	25.0%	31.0%	8.6%
	21-24	0.8%	8.8%	15.9%	18.0%	23.2%	33.3%	11.3%
	25-54	0.8%	8.9%	15.2%	17.5%	21.4%	36.2%	52.4%
	55-74	0.9%	10.4%	16.4%	18.3%	21.6%	32.4%	10.4%
	75+	1.6%	14.1%	19.7%	23.8%	21.1%	19.7%	2.5%
	Other/unknown	0.9%	10.4%	20.4%	20.0%	16.3%	31.9%	11.2%

Field Test of a Safety Program

The Problem

- Speeding associated with 1 in 3 highway fatalities
- Higher speeds cause greater pedestrian injury
- Traditional traffic calming not applicable to all streets

Motivations

- Neighborhood requests for speed reduction
- Emergency services objecting to many traditional treatments on select streets
- Desire to improve pedestrian safety
- Need to have techniques that can be implemented quickly

Objectives

- Develop methods to “calm” streets where traditional calming can’t be used
  - Education
  - Enforcement
  - Innovative markings
- Determine if effects of traditional calming can be enhanced by education and enforcement

Test Cities and Segments

- Phoenix, AZ
  - Existing humps
  - Through street with active neighborhood group
  - Very wide segment
  - Through street by park and schools
  - Neighborhood collector
- Peoria, AZ
  - Busy collector x 2
  - Quiet side street with humps
  - Wide boulevard with active neighborhood group

Test Situations

- Existing physical calming
- No existing calming but calming planned
- No existing or planned calming

Program Materials/Activities

- Street sign
- Lawn sign
- Printed Materials
  - Homeowners
  - Parents
  - Car dealers
  - "Ticket"
  - High schoolers

Coordinated by Logo


TRAFFIC
CONTROL
AREA
HEED
THE
SPEED!
PLEASE
HEED
THE
SPEED!

Program Materials/Activities

- Live copy radio
- Neighborhood newspaper articles
- Earned media
- Special enforcement
  - Police patrols – warnings and tickets
  - Neighborhood watches
  - Radar speed trailers


Engineering
Humps
Speed Tables
Without visual treatment
With visual treatment

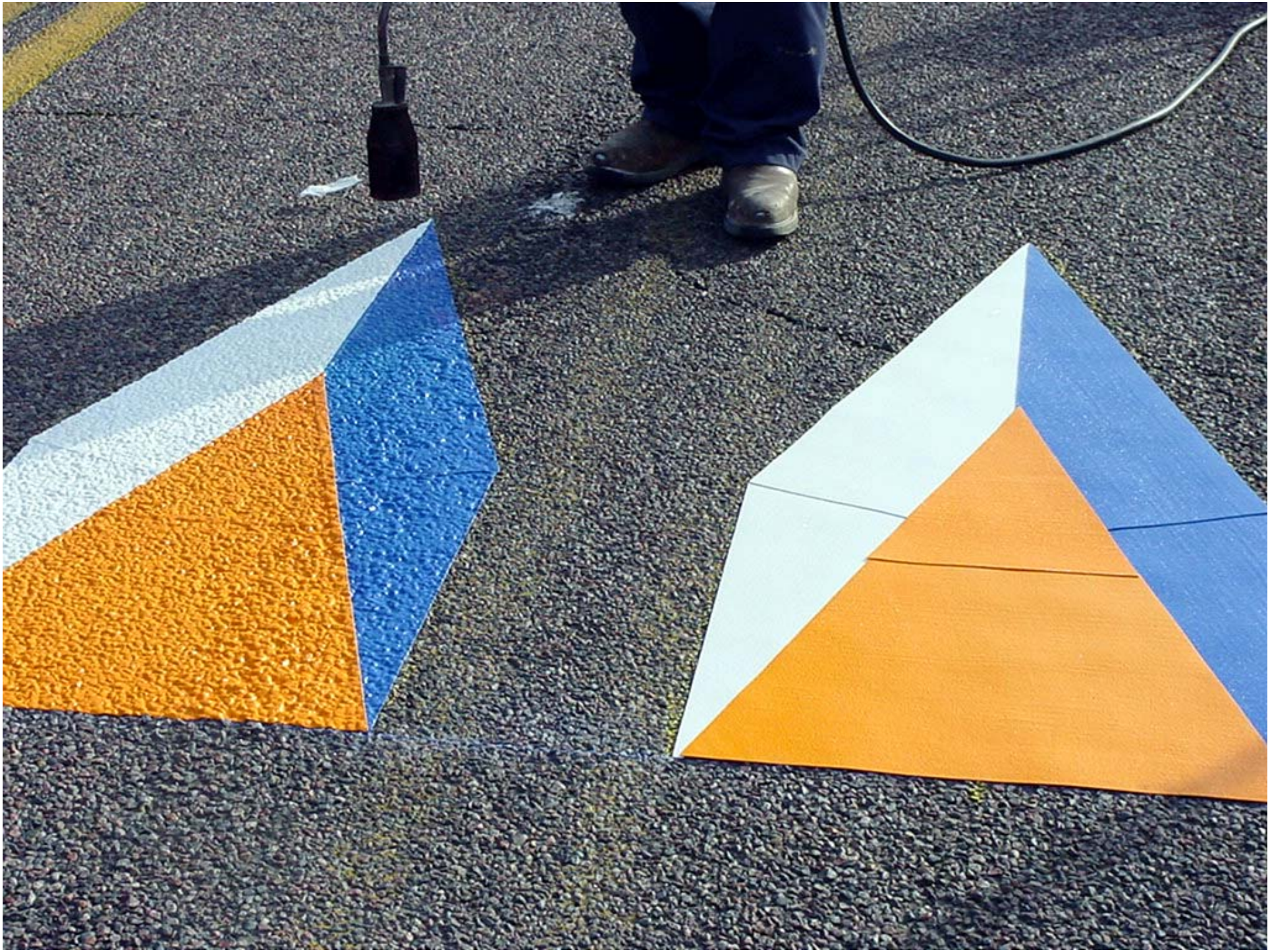
Innovative Visual Treatments

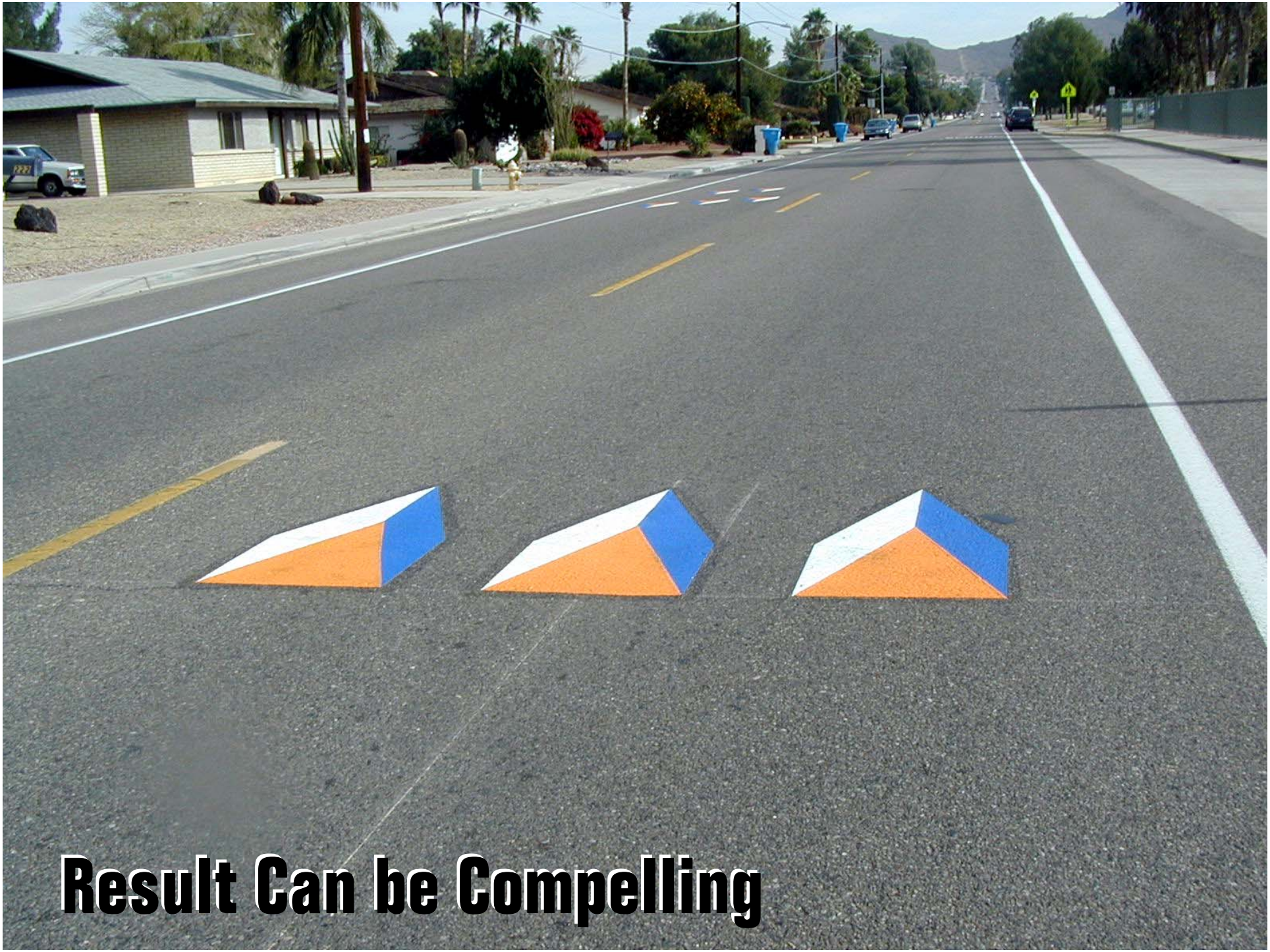
- 3-D Markings
  - Thermoplastic “illusions”
  - Used alone and on speed tables
- Tyregrip®
  - Surface texture (binder and aggregate)
  - Intended for skid resistance but used to mimic a speed table

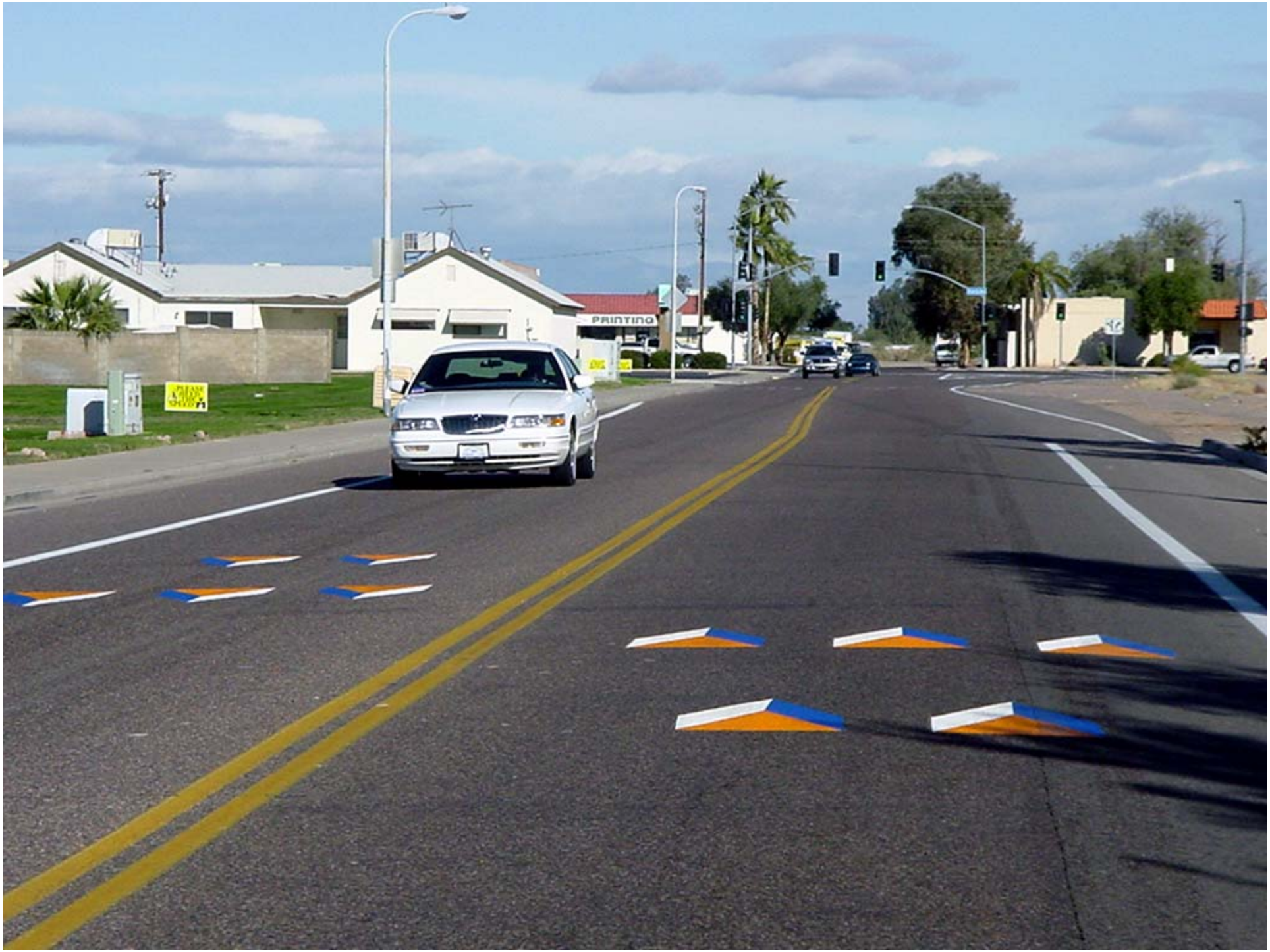

3-D Markings


Pattern Laid Out


Then Heated to Adhere




Result Can be Compelling


PRINTING


Tyregrip®

Phoenix Study Areas

- Clarendon Avenue
- Sweetwater Avenue
- Moon Valley/Coral Gables
  - Moon Valley Drive
  - Coral Gables Drive
  - North-south segment
  - East-west segment

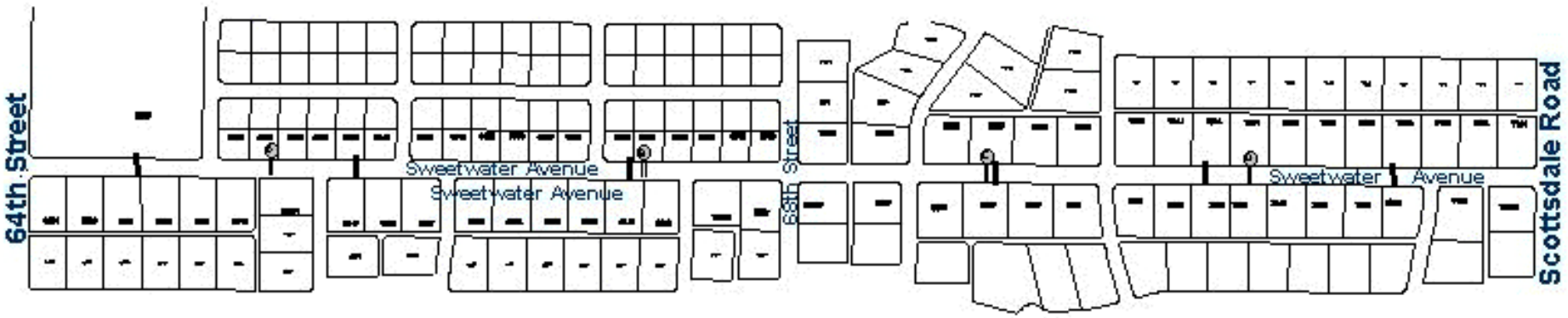
Peoria Study Areas

- Bell Park/84th Avenue and 85th Lane
- Desert Harbor/91st Avenue
- 95th Avenue

Sweetwater Ave Study Location Map

| - TYREGRIP LOCATIONS

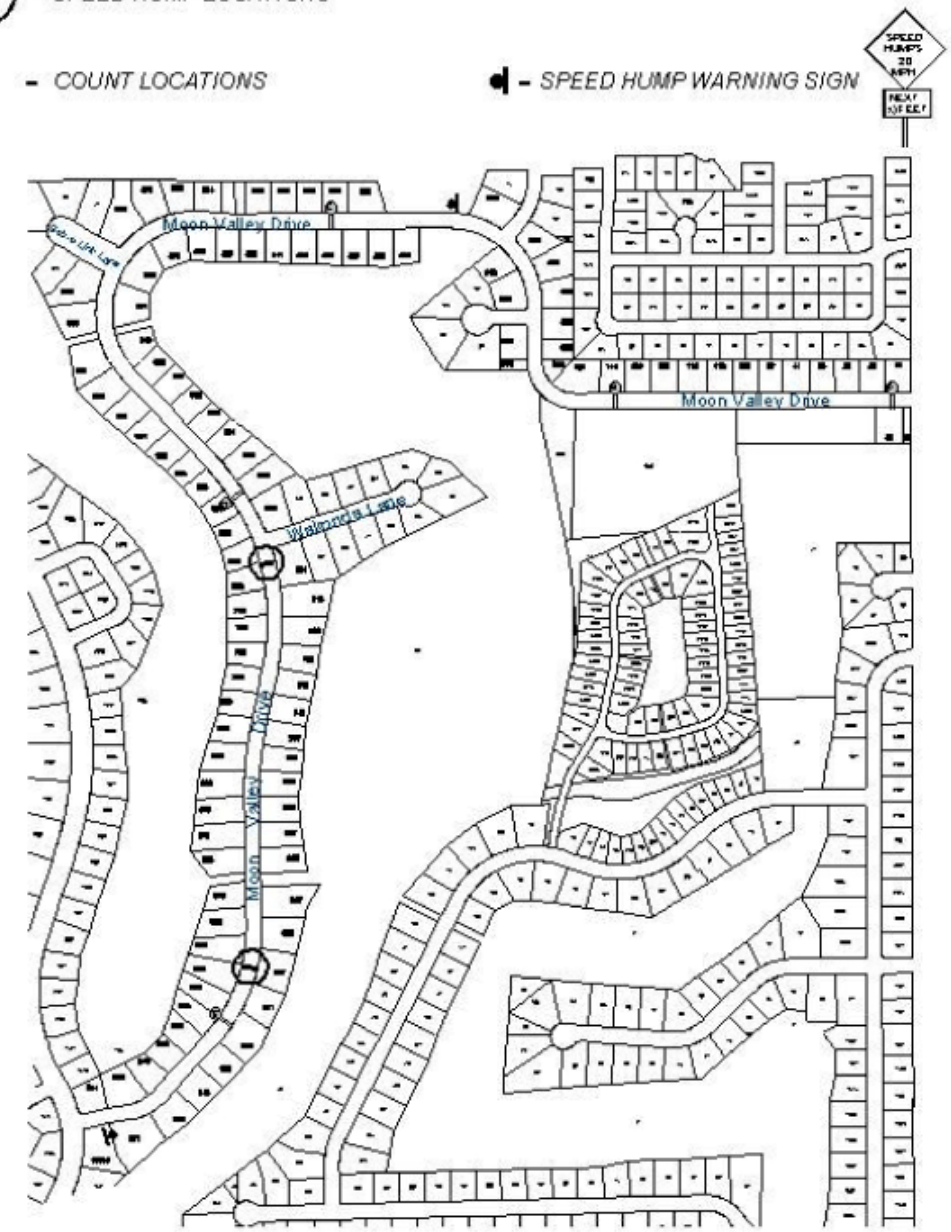
- COUNT LOCATIONS



- SPEED HUMP LOCATIONS

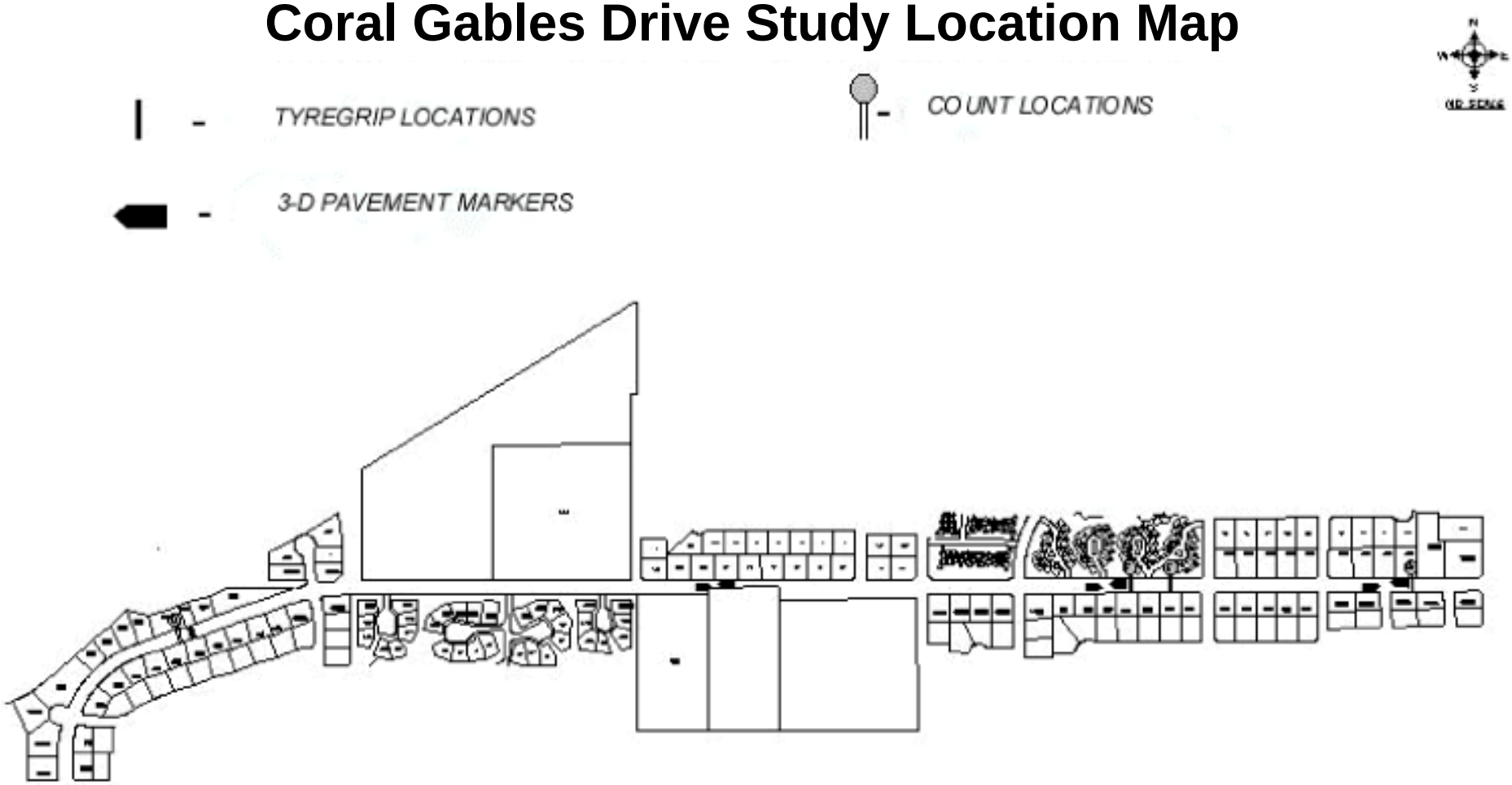
- COUNT LOCATIONS

- SPEED HUMP WARNING SIGN



STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX TRAFFIC OPERATIONS DIVISION

Coral Gables Drive Study Location Map



A MESSAGE FOR PARENTS

When cars speed in residential neighborhoods, it is your children who are at greatest risk. Children act impulsively and frequently run into the street without searching carefully for cars. This problem is compounded when cars speed. If struck by a car going 40 mph, a child is 17 times more likely to die than when hit by a car going 20 mph. It's important for parents to teach their children to be safe pedestrians by stopping and looking left-right-left before entering the street.

Many parents in Phoenix and Peoria have expressed concern about the speeds that cars travel in their neighborhoods. **Heed the Speed** is a program that uses education and enforcement to reduce those speeds.

Heed the Speed in your neighborhood could include:

- Distribution of flyers
- Display of neighborhood signs
- Neighborhood speed watch
- Newsletter articles
- Feedback signs
- Officers on bicycles
- Police verbal warnings
- Radar speed boards/trailers
- Targeted enforcement
- Presentations to residents
- Roadway applications that simulate humps
- Automatic enforcement trailer

You can make **Heed the Speed** a success by:

- ***Putting up signs***
- ***Supporting the police***
- ***Driving slower***
- ***Asking others to slow down***
- ***And teaching your children to search left-right-left before entering the street***

For further information about **Heed the Speed**, please contact:

Phoenix: Michael Cynecki, Phoenix Street Transportation Department, 602-262-7217

Peoria: Kelly LaRosa, Peoria Traffic Division, 623-773-7652

SPEED IS LETHAL!

If you hit a pedestrian

- At 20 mph, 5% will die
- At 30 mph, 45% will die
- At 40 mph, 85% will die
- At 50 mph almost all will die

You need time and space to stop

- At 20 mph it takes you 47 feet to stop your car
- At 30 mph, the distance almost doubles (88 feet)
- At 40 mph, it almost doubles again (149 feet)

For a speeding ticket, you'll get

- A fine of over $100
- An insurance increase of hundreds of dollars
- 3 points on your license

Slow down and make your neighborhood safer

City of Phoenix **City of Peoria**

Sources: *Arizona Driver License Manual*; Transportation Research Board Special Report No. 254: *Managing Speed.*

A MESSAGE FOR CAR DEALERS

When cars speed in residential neighborhoods, both drivers and pedestrians are at risk. If struck by a car going 40 mph, a person is 17 times more likely to die than when hit by a car going 20 mph. When conducting test drives, people frequently drive too fast. To be safe, it's important that test drives be made at reasonable speeds and that they avoid neighborhood streets when possible.

Many people in Phoenix and Peoria have expressed concern about the speeds that vehicles travel in their neighborhoods. **Heed the Speed** is a program that uses education and enforcement to reduce those speeds. It is a collaborative effort of the traffic and police departments of the cities of Phoenix and Peoria with support from the National Highway Traffic Safety Administration of the U.S. Department of Transportation.

You can help make **Heed the Speed** a success by:

- ***Asking customers to slow down***
- ***Driving slower yourself***
- ***Avoiding test drives on neighborhood streets***

For further information about **Heed the Speed**, please contact:

Phoenix: Michael Cynecki, Phoenix Street Transportation Department, 602-262-7217

Peoria: Kelly LaRosa, Peoria Traffic Engineering Division, 623-773-7652

Preliminary Process Findings

- > 1/2 drivers stopped for speeding lived in or near the neighborhood
- Flagrant speeding warranted tickets
- Extent of education depended on amount of involvement of the locals
- Pre/post mail survey showed significant awareness of *Heed the Speed*

Preliminary Speed Findings

- Significant speed reductions on all road segments except one that started with humps and very low speeds
- Got speed reduction between humps on road with longstanding calming
- Significant drop in
  - Average speed
  - Average speed above limit
  - Average speed of speeders
  - Number going more than 7 mph over
- Mean reductions from .5 to over 3.5 mph

What Does it Mean?

- Speeds can be reduced by education and enforcement on roadways that have not been calmed
- Traffic calming can be enhanced by education and enforcement
- Effects related to
  - Involvement of citizens
  - Willingness of police to patrol
- Long-term effects unknown
- More research needed to determine effects on safety

Other Research

- Pedestrian and Bicyclist Update
- Pedestrian and Motorist Compliance
- Pedestrian and Bicyclist Attitudes and Behavior
- Miami Demonstration Project
- Evaluation of Safe Routes to School Programs

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